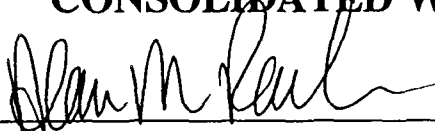
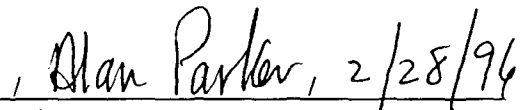


**Rocky Flats Environmental Technology Site**  
**4-I59-ENV-OPS-FO.41**  
**REVISION 1**  
**SYSTEM NORMAL OPERATIONS**  
**CHEMICAL PRECIPITATION/MICROFILTRATION PROCESS**  
**CONSOLIDATED WATER TREATMENT FACILITY**

APPROVED BY:



RMRS Vice President,  
Environmental Restoration

 2/28/96

Print Name

Date

FFFO/ER Concurrence on file: ☐ Yes ☐ No ☒ NA

Environmental Protection Agency Approval Received: ☐ Yes ☐ No ☒ NA

Responsible Organization: Environmental Operations Management Effective Date: 2/28/96

REVIEW BY THE FOLLOWING DISCIPLINES IS DOCUMENTED IN THE PROCEDURE HISTORY FILE:

Data Management and Reporting Services  
Environmental Operations Management  
Waste Management  
Industrial Hygiene  
Occupational Safety  
Quality Assurance  
Radiological Health and Engineering

**USE CATEGORY 3**

ORC review not required

The following have been incorporated in this revision:

N/A

Periodic review frequency: 1 year from the effective date

**DOCUMENT CLASSIFICATION  
REVIEW WAIVER PER  
CLASSIFICATION OFFICE**

LIST OF EFFECTIVE PAGES

<u>Pages</u>	<u>Effective Date</u>	<u>Change Number</u>
1-23 ____ / ____ / ____		

TOTAL NUMBER OF PAGES: 23

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
TITLE PAGE	1
LIST OF EFFECTIVE PAGES	2
TABLE OF CONTENTS	3
1. PURPOSE	4
2. SCOPE	4
3. OVERVIEW	4
4. LIMITATIONS AND PRECAUTIONS	4
5. PREREQUISITES	5
5.1 Planning and Coordination	5
5.2 Operations Preparation	5
5.2.1 Preparation for Startup	5
5.2.2 Preparation for Shutdown	11
6. INSTRUCTIONS	11
6.1 System Startup	12
6.2 Filtration Operating Cycle	14
6.3 System Recirculation	17
6.4 Placing System On-Line Following Recirculation	17
6.5 System Shutdown	18
7. POST-PERFORMANCE ACTIVITY	
8. REFERENCES	20
<u>Appendixes</u>	
Appendix 1, Facility Operations Form	21
Appendix 2, Valve Position Table - Normal Operations	22
Appendix 3, Valve Position Table - System Shutdown	23

1. **PURPOSE**

This procedure describes the administrative and operations steps at the Rocky Flats Environmental Technology Site for treating surface water through the Chemical Precipitation/MicroFiltration (CP/MF) process of the Consolidated Water Treatment Facility (CWTF). The operating instructions include detailed descriptions and instructions for normal operation of the CP/MF treatment system.

2. **SCOPE**

This procedure applies to all Environmental Restoration Program Division (ERPD) Operations Support and subcontractor personnel.

This procedure addresses the following topics:

- Preparation for CP/MF treatment system startup
- Preparation for CP/MF treatment system shutdown
- CP/MF treatment system startup
- Operation of the filtration operating cycle
- CP/MF treatment system recirculation
- Placing the CP/MF treatment system on-line following recirculation
- CP/MF treatment system shutdown

3. **OVERVIEW**

This procedure implements the requirements for normal operations of the CP/MF treatment equipment at the CWTF surface water facility located in OU1 consisting of Building 891 and treatment Trailers (T) 900A and 900B. With a full compliment of filter modules in place, the CP/MF treatment system is designed to process in the range of 40-70 gpm of contaminated water.

Following the requirements of this procedure ensures that normal operations of the water treatment system occur in a uniform and safe manner. This procedure is used by the operator(s) during normal operation of the CWTF CP/MF treatment system.

The CP/MF system consists of the following subsystems:

- Chemical treatment
- Concentration and microfiltration
- Neutralization
- Solids dewatering

4. **LIMITATIONS AND PRECAUTIONS**

- Wherever chemicals are stored and dispensed, extreme care shall be taken.
- The HASP is the governing safety document and shall be followed by all ERPD Operations Support and subcontractor personnel.
- Startup of the system requires two Qualified Operators.

4. **LIMITATIONS AND PRECAUTIONS (continued)**

- Care shall be taken to prevent objects from falling into tanks.
- If an object falls into one of the tanks, the system must be shut down, locked and tagged out before retrieving the object in a safe manner.
- Loose clothing and long hair shall be kept away from rotating parts such as mixer shafts and pump fans.
- The coupling guard shall be in place whenever the process pump (PP-8-1) is running.
- All metering pump hoses shall be properly secured to avoid spraying chemicals.

5. **PREREQUISITE ACTIONS**

5.1 **Planning and Coordination**

**CWTF Responsible Manager**

- [1] Ensure that treatment operations are listed on the Plan of the Day (POD) meeting.

**Lead Operator /Operator**

- [2] Attend a pre-shift safety briefing covering plant operation prior to the initiation of this procedure.

**Health and Safety Specialist**

- [3] Conduct a pre-shift safety briefing covering plant operation prior to the initiation of this procedure.

5.2 **Operations Preparation**

5.2.1 **Preparation for Startup**

- [1] Don the appropriate Personal Protective Equipment (PPE) as required in the HASP.
- [2] Energize the control panels in T900A and T900B as follows:
- [A] Verify that all control switches on the control panels are OFF.
  - [B] Depress POWER ON and observe that the POWER ON pushbutton lamp illuminates after depressing each pushbutton.

**NOTE** *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running.*

**NOTE** *Placing the control switch for a valve or pump in AUTO may or may not illuminate the control switch and cause the valve or pump to operate, depending on control logic.*

### 5.2.1 Preparation for Startup (continued)

- [3] Place all automatic valve control switches on the T900A control panel in AUTO.
- AV-908
  - AV-909
  - AV-911
  - AV-912
  - AV-913
  - AV-914
  - AV-915
  - AV-916
  - AV-917
  - AV-918
  - AV-919
  - AV-930
  - AV-935
- [4] Clean and calibrate the system pH probes prior to system startup:
- [A] Ensure that the following control switch(es) are in OFF for the associated probe.
- pH-1 for Acid Metering Pump MP-1-1
  - pH-2 for:
    - Auxiliary Metering Pump MP-5-1
    - Lime Recirc/Delivery Valve
    - Lime Recirc/Delivery Pump TP-6-1
  - pH-11 for Acid Metering Pump MP-11-1

#### CAUTION

Scratching or shattering probe tip components during removal and installation of probe may cause the probe to become inoperative.

- [B] Remove the selected probe from its tank mounting.
- [C] Immerse the probe tip in a minimum of one inch of dilute (approximately 5%) hydrochloric acid (HCl) for a minimum of 30 seconds.
- [D] Remove the probe from the acid and rinse it with distilled water.
- [E] Place the probe in a pH 7.0 buffer solution and monitor the pH reading. (Check expiration date for all buffer solutions used in calibrations.)

The reading may only vary plus or minus 0.05 standard units of the buffer solution value or the OFFSET rheostat must be adjusted.

### 5.2.1 Preparation for Startup (continued)

[F] IF the pH probe requires adjustment,  
THEN use the OFFSET fine adjustment rheostat located inside the pH indicator display panel.  
The Lead Operator's approval is required for changing the setting of the coarse adjustment  
rheostat.

[G] Remove the probe from the 7.0 buffer solution and rinse it with distilled water.

[H] For pH-2 probe:

- Place pH-2 probe (from TK-2) in a pH 10.0 buffer solution

For pH-1 (from TK-1) and pH-11 (from TK-11):

- Place probe in pH 4.0 buffer solution

AND monitor the pH reading.

The reading may only vary plus or minus 0.05 standard units of the buffer solution value or the  
SPAN rheostat must be adjusted.

[I] IF the pH probe requires adjustment, THEN use the SPAN fine adjustment rheostat located inside  
the pH indicator display panel. The Lead Operator's approval is required for changing the setting  
of the coarse adjustment rheostat.

[J] Following each adjustment, re-check the reading obtained in both buffer solutions.

[K] After a satisfactory calibration is achieved, carefully place the probe back in its tank mounting and  
tighten its threaded cap.

[L] Repeat steps [4][A] through [4][K] for all pH probes.

**NOTE** *The recommended solids concentration in TK-8 is 2 to 5% by weight and the duration of transfer  
will depend upon the percent solids from the previous processing run. The percent solids are  
determined by the laboratory procedure located in the front of the percent solids logbook located  
in B-891.*

**NOTE** *A higher concentration of solids may be pumped to TK-12 by performing transfers after the solids  
in TK-8 have settled.*

[5] To transfer concentrated solids from Concentration Tank TK-8 to Sludge Holding Tank  
TK-12, perform the following:

[A] Ensure there is adequate room in TK-12 prior to transferring sludge.

[B] Verify that MV-923 is OPEN.

5.2.1 Preparation for Startup (continued)

CAUTION

Use of the AUTO setting of the sludge pump is not recommended because TK-12 can overflow if the water return line becomes clogged.

- [C] Place the SLUDGE PUMP SP-1 control switch in HAND.
- [D] Monitor tank level during transfer operations.
- [6] Start all tank mixers:
  - [A] At the control panel in T900A, place the MIXER MX-11 control switch in AUTO.
  - [B] At the control panel in T900B, place the control switch for the following mixers in ON:
    - MX-1
    - MX-2
    - MX-5
    - MX-6
  - [C] Place the switch on the mixer motor for MX-4 to ON and observe mixer shaft turning.
  - [D] Place the toggle switch on the mixer motor for MIXER MX-21-1 to the ON position.
  - [E] Place the toggle switch on the mixer motor for MIXER MX-22-1 to the ON position.
- [7] Place the AUXILIARY METERING PUMP MP-5-1 control switch in AUTO.
- [8] Verify that all chemical supplies for use by the system are sufficient:
  - Sulfuric Acid ( $H_2SO_4$ ) for use in Reaction Tank TK-1 and Neutralization Tank TK-11
  - Lime (calcium hydroxide) ( $Ca(OH)_2$ ) for use in Reaction Tank TK-2
  - Ferric sulfate ( $Fe_2(SO_4)_3$ ) for use in TK-1
  - Sodium Hydroxide (NaOH) for use in TK-2
- [9] Ensure that the recommended concentrations in the chemical feed tanks are:
  - Sulfuric Acid Feed to TK-1:  
Prepare a 20% solution of  $H_2SO_4$  by pumping 1 gal of 93% to 98%  $H_2SO_4$  from T-20 to each 4 gal of water in TK-5.
  - Ferric Sulfate Feed to TK-1:  
Add 1 lb of ferrifloc per 1 gal of water in TK-4.

**NOTE**      *Use appropriate volumes and weights of chemicals per available volumes in each chemical tank.*



### 5.2.1 Preparation for Startup (continued)

**NOTE** *Ferrifloc is the trade name for acidified  $\text{Fe}_2(\text{SO}_4)_3$ . Ferrifloc contains 89 % ferric sulfate and ferric sulfate contains 28% iron. Therefore, Ferrifloc contains 25% iron, and 1 lb of Ferrifloc per gal is equivalent to 0.25 lb of iron per gallon.*

- Lime Feed to TK-2:

- For the Wilden M.025 Pump delivery system, add 1 lb of  $\text{Ca}(\text{OH})_2$  per 8 gal of water. This solution strength is approximately 1.5%  $\text{Ca}(\text{OH})_2$ .
- For the Warren Rupp Pump delivery system, add 1 lb of  $\text{Ca}(\text{OH})_2$  per 1 gal of water. This solution strength is approximately 12%  $\text{Ca}(\text{OH})_2$ .

**NOTE** *Higher concentration solutions of lime may be used provided that the lime delivery lines do not become plugged.*

- Sulfuric Acid Feed to TK-11 (Neutralization):

Prepare a 3 % solution of  $\text{H}_2\text{SO}_4$  by transferring 1gal of 93 % to 98 %  $\text{H}_2\text{SO}_4$  from TK-20 to each 32 gal of water in TK-21.

**NOTE** *Working capacity for T-21 is 144 gallons. The above ratio should be used to determine amounts necessary to maximize tank usage.*

- Caustic feed to TK-2:

Transfer approximately, but no more than, 144 gallons of 50 % NaOH from T-208 to T-22.

### CAUTION

Chemical levels in TK-5 and TK-6 should be above the mixer blade prior to start-up of the system. Tank lids must be closed to protect personnel from the possibility of splashing chemicals due to low levels in tanks.

[10] Adjust metering pump frequency and stroke as follows:

- Sulfuric Acid to TK-1:

Perform the initial adjustment by setting the frequency at 50 and the stroke at 50 and adjusting until overshoot (pH below specifications) in TK-1 is minimized;  
pH 1 probe controls delivery to maintain pH between 3.5 and 5.0.

- Ferric Sulfate Feed to TK-1:

Determine the ferric sulfate feed rate by the influent flow rate and the desired iron concentration. Use the following calculation to determine the correct feed rate.

$$\frac{\text{Desired Concentration of Iron in}}{\text{Influent Feed Rate (gal/min.)} \times 3.785 \text{ L/gal} \times \text{Treated Water (mg/ml)}} = \frac{\text{Feed Rate for Ferric Sulfate}}{\text{Iron concentration in Ferric Sulfate Feed (mgFe/ml)} \quad (\text{ml/min.})}$$

### 5.2.1 Preparation for Startup (continued)

Example      $60 \text{ gpm} \times \frac{3.785 \text{ l/g} \times 15 \text{ mg/l}}{30 \text{ mgFe/ml}} = 113.6 \text{ ml/min.}$

The iron concentration in the ferric sulfate feed will be 30 mgFe/ml if 1 lb of Ferrifloc is added per 1 gal of water. The normal desired dosage will be 15 mgFe/l.

- Lime Feed to TK-2:  
Control the lime feed using one of the following methods:
    - pH control method:  
Control the lime feed to TK-2 with probe pH-2. The Warren Rupp Pump continuously recirculates the lime slurry. Use the air operated pinch valve to add lime as required. A diaphragm valve located between the pinch valve and TK-2 allows adjustment of the amount of lime added per cycle of the pump to minimize overshoot of the pH. The system normally operates within a pH range of 10. to 11.
    - Volumetric method:  
Add lime directly to TK-2 at a continuous predetermined addition rate (typically 1 to 1.5lbs. of lime per 1000 gal. of water processed) using the Wilden M0.25 Pump and a direct line to TK-2. Control the addition rate by varying the pump air supply pressure by adjusting the air regulator on the supply to the pump. Also, adjust lime addition rate as needed by varying the lime slurry concentration in the lime tank.
  - Sulfuric Acid Feed to TK-11:  
Set the metering pump to add sulfuric acid as required by pH-11. Adjust the stroke and frequency to assure that the pH remains between the required band of 6.5 to 9.0 when acid is added to the neutralization tank. Minimize "overshooting" as much as possible.
  - Caustic Feed to TK-2:  
Probe pH-2 controls the caustic feed to TK-2 when the lime system is in the volumetric method. The metering pump stroke and speed are adjusted to minimize overshoot of the desired pH range of 10. to 11.
- [11] Ensure that all metering pumps are operational using the following procedure for each pump:
- [A] Place the control switch on the control panel for the selected metering pump in HAND.
  - [B] Place the control switch from HAND to AUTO.
- [12] Using a graduated cylinder and stop watch or watch with a second hand, monitor the discharge of the ferric sulfate and lime volumetric metering pumps for correct feed rate.

### 5.2.1 Preparation for Startup (continued)

**NOTE** *Information to accomplish Steps [13], [14] and [15] is located in the pump service manual portion of the Operations and Maintenance Manual for the Rocky Flats Chemical Treatment and Microfiltration System manual, located in the B-891 office.*

- [13] **IF** a metering pump becomes air bound and requires priming,  
**THEN** follow the instructions contained in the pump service manual.
- [14] Ensure that oil is **VISIBLE** in the glass oiler for process pumps.
- [15] **IF** oil is **NOT VISIBLE** in the glass oiler for a process pump,  
**THEN** add oil to the process pump oiler as recommended in the pump service manual.
- [16] Record all activities in the CWTF Operations Log Book.

### 5.2.2 Preparation for Shutdown

- [1] Ensure that TK-11 level is high enough so cleaning cycles will operate in **AUTO**.
- [2] Ensure that the pH in TK-11 is between 6.5 and 9.0 standard unit.
- [3] Record all activities in the CWTF Operations Log Book.

## 6. INSTRUCTIONS

### 6.1 System Startup

#### Operator

- [1] Open the following manual valves in T900A:
  - MV-902
  - MV-903
  - MV-904
  - MV-905
  - MV-906
  - MV-907
  - MV-929
- [2] Open MV-995 in T900B.
- [3] Perform the following for recirculation from T-200 into T-200:
  - [A] Open HVA-200, HVB-200, HVA-202, MV-9024 and MV-9026.
  - [B] Close HVA-201, MV-9027 and MV-9032.
  - [C] Record initial T-200 level in operational log.

## 6.1 System Startup (continued)

### Operator (continued)

- [D] Turn HOA switch for FP-1 to AUTO on the control panel in T-900B, then turn the OFF/ON switch to ON at the T-900A control panel.

This action will recirculate flow from T-200 through the MEMTEK system and back to Tank T-200 until the discharge pH from TK-11 is within specifications (6.5 to 9.0). Water that is not within the specified pH range must be recirculated.

- [4] Perform the following for recirculation from T-201 to T-201:

- [A] Open valves HVA-201, HVA-202, MV-9024 and MV-9027.

- [B] Close valves HVA-200, HVB-200, HVB-201, MV-9026 and MV-9032.

- [C] Record initial T-201 level from the PLC readout in 891 Main Control Room in operational log.

- [D] Start FP-1 per 3 [C] above.

**NOTE** *Pumping water to the influent tanks from the French drain, B-891 sump, B-891 tank farm sump or T-900A/B sump is possible due to the configuration of influent lines and valve line-ups associated with recirculation as described above. **PUMPING FRENCH DRAIN, B-891 SUMP, B-891 TANK FARM SUMP OR T-900A/B SUMP DURING RECIRCULATION OPERATIONS WILL RESULT IN THE MIXING OF INFLUENT WATERS.***

- [5] Energize the pH-11 strip chart recorder in T900B, and record the recirculation start date and time on the strip chart.
- [6] Place the TURBIDITY MONITOR PUMP control switch to ON.
- [7] Place the Turbidity Meter toggle switch to ON, and observe needle deflection, indicating the meter is ON.
- [8] Calibrate the Turbidity meter per manufacturer's instructions.
- [9] Ensure that the Range Select switch on the turbidity meter is set so that the reading is close to mid-range on scale.

**NOTE** *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running.*

**NOTE** *Placing the control switch for a valve or pump in AUTO may or may not illuminate the control switch and cause the valve or pump to operate, depending on control logic.*

## 6.1 System Startup (continued)

[10] Place the FEED PUMP FP-1 control switch on the control panel in T900B in AUTO.

[11] Place the FEED PUMP FP-1 control switch in T900A in ON.

[12] Place the LIME RECIRC/DELIVERY PUMP TP-6-1 control switch in ON.

[13] Ensure that there is adequate flow through the influent rotameter located above MV-996 adjacent to TK-1.

[14] Place the SEAL FLUSH WATER PUMP TP-11-2 control switch in AUTO.

**NOTE** *The process pump PP-8-1 operates the membrane module trains. Level control LC-8-2 in concentration tank TK-8 starts the pump as the tank fills. Operating the process pump in the HAND position requires continuous monitoring of concentration tank level.*

[15] Place the PROCESS PUMP PP-8-1 control switch on the control panel in T900A in AUTO.

**NOTE** *Altering the order in which pumps are started may be necessary due to various tank levels and membrane flow rates that are part of normal operations.*

[17] Ensure that seal water flow rate through PROCESS PUMP PP-8-1 and CLEANING PUMP CP-1 seals is a minimum of 0.1 gpm (by measuring the seal water system discharge into TK-8 with a graduated cylinder and a stop watch or watch with a second hand) and a minimum pressure of 30 psi.

**NOTE** *Once the process pump is operating, filtrate should be flowing to the filtrate neutralization system. Concentrate should be returning to concentration tank TK-8. The system should be operating without any alarm conditions triggered.*

[18] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND.

[19] Set the EFFLUENT FLOW CONTROLLER (EFC) valve AV-980 in the range of 40 to 70 gpm with the touch pad located on the T-900A control panel.

[20] **WHEN** discharge pH from TK-11 is stable between the specified range of 6.5 to 9.0 su, **THEN** discontinue recirculation and begin discharging to Tank T-202:

[A] To end the recirculation mode and begin processing water from either tank T-200 or T-201 through the CP/MF system and into tank T-202, open the following valve:

- MV-9032

- Close valve HVA-202. This will direct flow to T-202.

## 6.1 System Startup (continued)

### Operator (continued)

- [21] Record discharge start time on the pH strip chart on control panel in T900A.
- [22] Record discharge start time and T-200 or T-201 Tank level on the Process Trailer Logs.
- [23] **IF** influent flow rate to TK-8 needs adjustment to control tank level,  
**THEN** throttle feed control valve MV-996, which is located below the rotameter by TK-1.

**NOTE** *Normally, TK-11 level is controlled by adjusting effluent flow rate using the Effluent Flow Controller EFC, but this may not be sufficient if membrane flow rates are high.*

- [24] **IF** the EFC is set to 50 gpm, and TK-11 level rises above the desired level,  
**THEN** open valve AV-935 by placing its control switch in HAND to return water from the outlet of the membranes back to TK-8.

Be aware that this will affect liquid level in both TK-11 and TK-8.

- [25] **IF** TK-11 liquid level continues to rise, **THEN** throttle down valve MV-921 to further reduce flow into TK-11. It is preferable, however, to leave MV-921 completely open whenever possible, as throttling will decrease membrane flow rate and increase the rate of membrane fouling.
- [26] Record all activities in the CWTF Operations Log Book.

## 6.2 Filtration Operating Cycle

### Operator

- [1] Refer to 4-I63-ENV-OPS-F0.45, Chemical Handling and Mixing Operations, Consolidated Water Treatment Facility for instructions for preparation of process chemicals.
- [2] Complete Facility Operations Log contained in Appendix 1, Facility Operations Form.
- [3] **IF** required to prime or set metering pumps, **THEN** refer to Section 5.
- [4] Verify that fresh water is flowing through the process and cleaning pump seals by observing flow into TK-8.

**NOTE** *The normal pH range for TK-1 is 3.5 to 5.0, for TK-2 is 10 to 11, and for TK-11 is 6.5 to 9.*

- [5] **IF** the pH in TK-1, TK-2, or TK-11 is **NOT** in specification, **THEN** place the system in recirculation.

6.2 Filtration Operating Cycle (cont.)

NOTE      *System pressure gauges require frequent monitoring to ensure proper system operation as provided by Table 1, Indicator Normal Operation Readings.*

- [6]    Ensure that the filtrate is clear in appearance and is flowing to discharge at the proper flow rate, as indicated by Flow Indicator Transmitter 1 (FIT-1), see Table 1.
- [7]    Refer to the Operations and Maintenance Manual, Rocky Flats Chemical Treatment and Microfiltration System manual for troubleshooting.
- [8]    Record all activities in the CWTF Operations Log Book.

TABLE 1  
INDICATOR NORMAL OPERATION READINGS

LINE PRESSURE INDICATORS (PSIG)

<u>MEMBRANE MODULES</u>		<u>PUMP WATER SEALS</u>
<u>PI-1</u>	<u>PI-2</u>	<u>PI-5</u>
35-43	10-14	30-45

LINE FLOW INDICATORS (GPM)

<u>WASTEWATER FEED</u>	<u>PUMP WATER SEALS</u>
15-60 GPM	0.1 - 0.25 GPM MINIMUM

CONTROL PANEL FLOW INDICATOR/TOTALIZERS (GPM)

MEMBRANE MODULES

FIT-1  
40-70 GPM MINIMUM a/

TK-11 DISCHARGE  
FIT-2  
40-70 GPM AVERAGE a/

pH INDICATOR/CONTROLLERS (pH)

<u>REACTION TK-1</u>	<u>REACTION TK-2</u>	<u>FINAL NEUT TK-11</u>
<u>pH-1</u>	<u>pH-2</u>	<u>pH-11</u>
3.5-5.0	10. - 11.	7.0-7.5 (Desired) 6.5-9.0 (Required)

a/ Based on Memtek specifications and current membrane configuration which includes blanks.



### 6.3 System Recirculation

#### Operator

- [1] Place the valves for the filtration operating cycle, which is the normal operation mode, according to the Valve Position Table - Normal Operation in Appendix 2.

To place the system into recirculation from the normal operating cycle processing and returning to T-200:

- [2] Open the following valves:
  - HVA-202
  - HVA-200
- [3] Close the following valves:
  - MV-9032

This will recirculate flow from T-200, through the CP/MF system and back to Tank T-200.

OR

To place the system into recirculation from the normal operating cycle processing and returning to T-201:

- [4] Open the following valves:
  - HVA-201
  - HVA-202
- [5] Close the following valve:
  - MV-9032

This will recirculate flow from T-201, through the CP/MF system, and return to tank T-201.

- [6] Record all activities in the CWTF Operations Log Book.

### 6.4 Placing System On-Line Following Recirculation

To place the system on-line, discharging to T-202

#### Operator

- [1] Open valve:
  - MV-9032
- [2] Close valve:
  - HVA-202
- [3] Ensure valves MV-9026 and MV-9027 are closed.

6.4 Placing System On-Line Following Recirculation (cont.)

- [4] Record all activities in the CWTF Operations Log Book.

6.5 System Shutdown

The entire waste treatment system can be shutdown during emergency situations by pushing **EMERGENCY STOP PUSHBUTTON** at each panel in T900A and T900B. This disables all panel power.

**NO LOW LEVEL AUTOMATIC SHUT DOWN OF THE FEED PUMP WILL OCCUR DUE TO LOW LEVELS IN INFLUENT TANKS - THEREFORE THE LEVELS IN THE INFLUENT TANKS MUST BE PERIODICALLY MONITORED THROUGHOUT SYSTEM OPERATIONS.**

**Operator**

**NOTE** *If the feed pump control switch in T900B is in HAND instead of AUTO, the feed pump will not stop when the feed pump control switch in T900A is placed in OFF.*

- [1] Verify that the FEED PUMP FP-1 control switch on control panel in T900B is in AUTO.
- [2] Place the FEED PUMP FP-1 control switch on the T900A control panel in OFF.
- [3] **WHEN** the level in TK-8 has been reduced enough to allow enough room to accept the solids flush volume,  
**THEN:**
- [A] Place the PROCESS PUMP PP-8-1 control switch in OFF.
- [B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF.
- [4] Place the pH strip chart recorder and turbidity monitor OFF, and record shutdown time on strip chart.
- [5] Close MV-995 so water from Tank T-200 cannot gravity flow through the system and overtop TK-8.
- [6] At the control panel in T900A, place all mixer and metering pump control switches to OFF:
- MX-11
  - MP-11-1
  - MP-11-2

6.5 System Shutdown (continued)

Operator (continued)

- [7] At the control panel in T900B, place all mixer and metering pump control switches in OFF:
  - MX-1
  - MX-2
  - MX-5
  - MX-6
  - MP-4-1
  - MP-5-1
  - LIME RECIRC/DELIVERY PUMP and/or LIME RECIRC DELIVERY VALVE
- [8] Place the switch on the mixer motor for MX-4 to OFF in T900B.
- [9] Place the toggle switch on the motor for MIXER MX-21-1 to the OFF position.
- [10] Place the toggle switch on the motor for MIXER MX-22-1 to the OFF position.
- [11] Record the Tank T-200, T-201 and T-202 level and time of shutdown in the CWTF Operations Log Book and on the System Process Flow Data Logs.
- [12] IF the system is shut down for less than 72 hours, flush the membrane modules in accordance with the Automatic Cleaning or Manual Cleaning instructions up to STEP 2 CHEMICAL CLEAN in 4-I60-ENV-OPS-FO.42, Chemical Cleaning Operations Consolidated Water Treatment Facility:
  - [A] Manually stop the SOLIDS FLUSH just prior to Step 2 by depressing CYCLE STOP pushbutton.
  - [B] Fill TK-10 as follows:
    - Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in AUTO.
    - Place the TANK FILL SELECT switch to the TK-10 position and push TANK FILL START pushbutton.
    - WHEN AV-914 and AV-917 automatically close,  
THEN place FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF.
- [13] IF the system is to be shutdown for more than 72 hours,  
THEN chemically clean the filter membranes in accordance with 4-I60-ENV-OPS-FO.42, Chemical Cleaning Operations Consolidated Water Treatment Facility.
- [14] Place all control switches on the control panels in OFF.
- [15] Depress EMERGENCY STOP pushbutton on both control panels to disable power to the system.

**6.5 System Shutdown (continued)**

**Operator (continued)**

[16] Record all activities in the CWTF Operations Log Book.

**7. POST-PERFORMANCE ACTIVITY SECTION**

Management of all records is consistent with 1-77000-RM-001, Records Management Guidance for Records Sources.

**CWTF Responsible Manager**

- [1] Ensure that the original and one copy, as required, of the following quality assurance (QA) records are transmitted to the ERPD Project File Center (PFC) in accordance with 2-G18-ER-ADM-17.01, Records Capture and Transmittal:
- Facilities Operations Log(s)
  - Process Flow Data Log(s)
  - CWTF Operations Log Book
  - Qualification/Training Documentation
  - Occurrence Reports

Submission of record copies to the ERPD PFC is in accordance with Administrative Record requirements as defined in 2-S65-ER-ADM-17.02, Administrative Record Document Identification and Transmittal.

There are no non-QA records generated by this procedure.

**8. REFERENCES**

Operations and Maintenance Manual Rocky Flats Chemical Treatment and Microfiltration System

Rocky Flats Plant Treatment Facility Health and Safety Plan

1-10000-HWR, Hazardous Waste Requirements Manual

1-77000-RM-001, Records Management Guidance for Records Sources

2-G18-ER-ADM-17.01, Records Capture and Transmittal

2-S65-ER-ADM-17.02, Administrative Record Document Identification and Transmittal

4-I60-ENV-OPS-FO.42, Chemical Cleaning Operations, Consolidated Water Treatment Facility

4-I63-ENV-OPS-F0.45, Chemical Handling and Mixing Operations, Consolidated Water Treatment Facility

4-159-ENV-OPS-FO.41  
REVISION 1  
PAGE 20 of 23  
24

TIME	FIT-1		FIT-2		pH			TURBIDITY		SEAL	MEMBRANES		OP. INITIAL
	FLOW (gpm)	TOTAL (gal)	FLOW (gpm)	TOTAL (gal)	TK 11	TK 1	TK 2	RAW (NTU)	TREATED (NTU)	PRES. (psig)	IN (psig)	OUT (psig)	
NORMAL RANGE	25-100		25-100		6-9	3.5-5	10-11	0-500	0-15	30-45	35-43	10-14	
0700													
0800													
0900													
1000													
1100													
1200													
1300													
1400													
1500													
1600													
DAILY TOTALS													

\* The Shift Foremen will be immediately notified of any readings outside the normal range.

• The Shift Foreman will be immediately notified of any readings outside the normal range.

Readings reviewed by Shift Foreman (signature)

101794

APPENDIX 2

Page 1 of 1

**VALVE POSITION TABLE - NORMAL OPERATION**

VALVE NO.	VALVE POSITION	VALVE NO.	VALVE POSITION
MV-901	0	MV-958	0
MV-902	0	MV-959	C
MV-903	0	MV-961	C
MV-904	0	MV-964	0
MV-905	0	MV-965	OAN
MV-906	0	MV-966	C
MV-907	0	MV-967	C
AV-908	C	MV-971	
AV-909	C	MV-972	
MV-910	0	MV-973	
AV-911	C	AV-980	FLOW CONTROL
AV-912	C	MV-981	C
AV-913	C	MV-982	0
AV-914	C	MV-943	C
AV-915	C	MV-963	C
AV-916	C	MV-985	C
AV-917	C	MV-986	0
AV-918	C	MV-987	0
AV-919	0	MV-988	C
MV-920	C	MV-989	C
MV-922	C	MV-990	C
MV-923	0	MV-991	C
MV-924	C	MV-992	C
MV-925	0	MV-993	0
MV-929	0	MV-995	0
AV-930	C	MV-996	OAN
MV-931	0	MV-997	C
MV-933	C	MV-998	C
MV-934	C	MV-999	C
AV-935	OAN	MV-921	0
MV-937	0	MV-968	C
MV-938	C	MV-969	C
MV-939	C	MV-103	0
MV-940	C	MV-984	0
MV-941	C		
MV-955	C		
MV-957	C		

KEY: 0 = OPEN C = CLOSED OAN = OPENED AS NEEDED

APPENDIX 3

Page 1 of 1

## VALVE POSITION TABLE - SYSTEM SHUTDOWN

VALVE NO.	VALVE POSITION	VALVE NO.	VALVE POSTION
MV-901	0	MV-958	C
MV-902	C	MV-959	C
MV-903	C	MV-961	C
MV-904	C	MV-964	0
MV-905	C	AV-965	C
MV-906	C	MV-966	C
MV-907	C	MV-967	C
AV-908	C	AV-980	C
AV-909	C	MV-981	C
MV-910	0	MV-982	0
AV-911	C	MV-983	C
AV-912	C	MV-984	C
AV-913	C	MV-985	C
AV-914	C	MV-986	0
AV-915	C	MV-987	0
AV-916	C	MV-988	C
AV-917	C	MV-989	C
AV-918	C	MV-990	C
AV-919	C	MV-991	C
MV-920	C	MV-992	C
MV-922	C	MV-993	0
MV-923	0	MV-995	C
MV-924	C	MV-996	0
MV-925	0	MV-997	C
MV-929	C	MV-998	C
AV-930	C	MV-999	C
MV-931	0	MV-921	0
MV-933	C	MV-968	C
MV-934	C	MV-969	C
AV-935	C	MV-103	0
MV-937	0		
MV-938	C		
MV-939	C		
MV-940	C		
MV-941	C		
MV-955	C		
MV-957	C		

KEY: 0 = OPEN    C = CLOSED    OAN = OPENED AS NEEDED